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Propositions and Applications: collaborating through the use of design methods

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Design and the Art of Management — *themed issue*

Ken Friedman, Laurene Vaughan and Jonathan Vickery

The editors of *Aesthesis* have been thinking of new approaches to 'the art of management' – or perhaps thinking about new ways to approach old problems. It seemed natural for us to think of design and design thinking as central to this intellectual endeavour – design is the process by which designated problem-solvers address the problems of legitimate stakeholders using innovation and creativity. But design is more than just problem solving. Design engages the sensibility, and designed artefacts take their shape in terms of feeling and form as well as function. The papers submitted for this issue on design, management, and organization covered all those areas and more.

In different shapes and guises, the articles in this issue all merge on the subject of 'design thinking', whether looking at 'tools', processes, experience or interactions. In terms of subject matter, the term 'design' in this issue emerges as a dynamic element of investigation into organizational learning, collaborative networks, product development, organizational resource management, service capability development, strategic urban planning, organizational creativity, contemporary art, and the conceptual-philosophical content of the epistemic functions of design that give us frameworks to think, create, assess, analyse and evaluate. Design always involves three great questions. How do we make things? How do we make things work? How do we make things work better?

Nobel Laureate Herbert Simon (1982: 129) defines design as the process by which we '[devise] courses of action aimed at changing existing situations into preferred ones.' Creating something new or reshaping something that exists for a purpose, meeting a need, and solving a problem, are courses of action toward a preferred situation even though we may not yet be able to articulate this preferred situation. This definition therefore covers most forms of design.

Design is not necessarily an outcome, but rather a process. The verb 'design' describes a process of thought and planning, and this verb takes precedence over all other meanings. The word 'design' had a place in the English language by the 1500s; its first written citation dates from the year 1548. Merriam-Webster (1993: 343) defines the verb design as 'to conceive and plan out in the mind; to have as a specific purpose; to devise for a specific function or end'. Related to these definitions is the act of drawing, with an emphasis on the nature of the drawing as a plan or map, as well as 'to draw plans for; to create, fashion, execute or construct according to plan'.

The American architect and designer Buckminster Fuller (1981: 229-231) describes design as the difference between a 'class-one evolution' and 'class-two evolution'. Class-one evolution is natural evolution according to Darwin, the natural phenomena studied through evolutionary biology. Class-two evolution involves 'all those events that seem to be resultant upon human initiative-taking or political reforms that adjust to the change wrought by the progressive introduction of environment-altering artifacts' (Fuller 1981: 229). Design is both intrinsic and essential to human development in a fundamental sense, but also creates artefacts that change the very context of that development.

One argument for the importance of design is the increasing number of areas now subject to human initiative. The vast range of technologies that surround us mediate most of the human world and influence our daily lives. These include the artifacts of information technology, mass media, telecommunication, chemistry, pharmacology, chemical engineering, and mechanical engineering, along with the designed processes of nearly every service industry and public good now available other than public access to nature. Within the next few years, these areas will come to include the artifacts of biotechnology, nanotechnology, and the new hybrid technologies.

Fuller's metaphor of 'the critical path', which was the title of his last book (1983), articulated a scenario where our world is as much subject to disintegration as it is development or growing better. The way that the new artificial world affects the natural world has immense ramifications that parallel Fuller's idea of class-two evolution. This is what Victor Margolin (2002) called 'the politics of the artificial', where design has become so intrinsic to our environmental development that we need seriously to assess its power, and create new boundaries, ethics and agreed protocols.

Design plays a role in the evolution of an increasingly manufactured world, from ordinary objects to advanced technology. The design process takes on new meaning as designers take on increasingly important tasks. These tasks are important not because designers are more visible and prestigious, but because design has greater effects and wider scope than ever before. Despite this scope and scale, however, robust design solutions are always based on and embedded in specific problems. In Jens Bernsen's (1986) memorable phrase, the problem comes first in design. Each problem implies partially new solutions located in a specific context. The continual interaction of design problems and design solutions generates the problematics and knowledge of the field.

Design as an activity translates utilitarian, symbolic, and psychological needs into functions; it translates needs and wants into ideas; and it translates these ideas into the structural descriptions and entities to produce required functions that satisfy needs. As such, design always serves strategic goals on some level, large or small. The different forms of professional design practice require a process incorporating the strategic and managerial aspects of design as well as the hands-on developmental application of design. These move from thinking, research, and planning at one end of the process, on to manufacture, assembly, packaging, and presentation at the other.

For business firms, design is a comprehensive part of an integrated process that links selecting challenges and solving problems to developing products and marketing them successfully. For business firms, design is a comprehensive part of an integrated process that links selecting challenges and solving problems to developing products and marketing them successfully. The immaterial forms of design process have long been hidden, and now we are in the midst of a transition. Getting from one point to the next in this complex map of process, project, and product requires 'design thinking'. Design is in the business literature and designers are being brought in to organizations as they seek new ways of being, working, and producing. It is an exciting time of evolution. The literature on design thinking and the role and contribution of design to the fields of organizational and business development is expanding – and this issue of *Aesthesis* is part of this process.

REFERENCES

Bernsen, J. (1986) *Design: The Problem Comes First*, Copenhagen: Danish Design Council.
Fuller, B. (1981) *Critical Path*, New York: St. Martin's Press.
Margolin, V. (2002) *The Politics of the Artificial: Essays on Design and Design Studies*, Chicago: University of Chicago Press.
Merriam-Webster, Inc (1993) Merriam-Webster's Collegiate Dictionary (Tenth edition), Springfield, Mass.
Simon, H. (1982) *The Sciences of the Artificial* (second edition), Cambridge, Mass.: MIT Press.

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Propositions and Applications

collaborating through the use of design methods

Laurene Vaughan, Nifeli Stewart, Michael Dunbar and Jeremy Yuille

This paper discusses the *design research strategy* that was utilized in the design and development of an online digital video prototyping and annotation tool. Undertaken as collaboration between an interaction design research team and a video production team, the project explored the use of propositions and application as a way to understand and extend our current concepts of practice and capability, through the co-design of a trial prototype.

It is widely accepted that well designed objects and systems help to enable better quality of life. Whether it is a chair, office space or management structure, the quality of the design and the subsequent experience of the user is an important aspect of our daily physical work environments. We believe the same is true for the design of our virtual and technological workspaces. Design practices and methods can help us work through the challenges inherent in the uptake of new technology and well-designed systems and environments enable businesses to maximize the benefits that new technologies and ways of working have to offer.

In recent years management discourse has centered on today's competitive forces; forces created from fundamental technological change and the impact of globalization (Bryan and Joyce 2007). In this new environment where knowledge, collaboration, flexibility and innovation are increasingly viewed as critical to business success, and as Barsh (2008) argues, new business models are needed with which to manage. These new business models will involve greater appreciation and use of knowledge management and social software technologies enabled by the internet. The introduction of these technologies will have significant ramifications for existing practices, communication skills, people's professional identities and management belief systems (Hagel 1999).

In contrast to this perspective the management literature is also full of stories of how unsuccessful organizations have been with change management programs. Across the literature a failure rate of 70% is widely quoted (Champy 1995; McKinsey Global Survey 2008). This is supported by reports articulating that attempts to change existing practices are one of the major challenges businesses face in the contemporary workplace (Cheney and Christensen 2004). In particular the high failure rate and disappointing results in return on investment for new technology is also widely noted (Johnson et. al 1995). Edmonson (2003: 1) highlights that 'technologies promise many advantages for organizations....yet the technology adoption process presents barriers to the realization of these advantages'. Diffusion research has a long history in identifying the numerous factors that facilitate or hinder technology adoption and implementation by both individuals and organizations as a whole. Fichman (1992) in his review of this literature highlights that organizational adoption is further complicated by the fact that individuals rarely have complete autonomy regarding the adoption and use of work place innovation. He highlights that factors such as managerial influences, adopter interdependencies, complex interactions between vested stakeholders, knowledge burden and the relationship between the information technology development group and its client organization, will impact on successful adoption and implementation of technology. Edmonson's (2003) research suggests that knowledge type (tacit or codified) is also a crucial factor in new technology performance and implementation success, that an organizations ability to learn as well as see demonstrated improvements will determine whether the technology is adopted or abandoned. In addition organizational routines reinforce the status quo and provide a source of resistance (Edmonson 2001). Hagel & Seely-Brown (2002) warn that while Web technology offers businesses the opportunity to reduce operating costs, increase flexibility, coordination and collaboration, to fully realize the economic potential of web service technology companies need to also redesign their business processes. Technology alone cannot realize these opportunities.

It is apparent from these accounts that an introduction of new technologies is complex and the potential for failure is high. This includes the design and development of digital collaboration and communication tools for commercial application; engaging users in the uptake of such tools even more so. This paper discusses a research project that has explored the use of the design methods of proposition and application in the design of a participatory prototyping platform for rich-media applications. The project is titled Protospace and the objective of the project was to explore the design and development of a work-tool or environment that would enable people to work in a collaborative and distributed manner.

Within the project the term 'prototyping' is used to articulate the generative activities of creative teams in the production of digital video outcomes; these activities span from initial idea generation through to the refinement of a completed outcome. This project was undertaken as a collaborative partnership between two research teams; one a team of interaction and communication designers, the other a digital video production team within an associated University Research Centre. This collaboration, and the diverse skills of those involved in it were essential to the project's development. The production team were both collaborators in the project and representative end users for the project's broader application.

This discussion is specifically focused on stage one of the Protospace project. This phase involved developing design propositions, exploring their application and, building and refining a prototype for exploration with an industry partner. The findings from this stage of the research provided the impetus for stage 2, which involved the testing of a more high fidelity prototype and a stage 3 beta testing of this system scheduled for early 2009.

METHODOLOGY

Proposition and Application

As a design exploration within the field of interaction design, this project has used two key components in realizing its outcomes: these are the *proposition* and the *application*.

Proposition Application

Design

These two aspects of the design process could be seen to occur chronologically within a project's realization, with the proposition leading to a solution/application for use, and design being the 'thing' that happens in the middle that makes it come to life [see diagrams over the page]. Within this project we have endeavored to utilize the two approaches throughout the project with the aim of undertaking an interconnected process of design exploration. Denyer et. al (2008) describes design propositions as inputs into the design of specific solutions. That, the development of design propositions require significant knowledge and expertise in alternative design propositions, intimate knowledge of local situations and business context, and evidence from field testing. Numerous publications have explored the importance of integrating the design knowledge, thinking and methods within a design project (Dourish 2006; Wolf et. al 2006). Within these discussions the focus is often on the need to integrate the creative with the technical; the system with the interface. This has been a core principal of this project; both the proposition and the application have been applied through an integrated and cyclical system that has focused on creating the optimum user experience, something that is only possible through aesthetics, systems and technologies working towards a harmonic outcome.

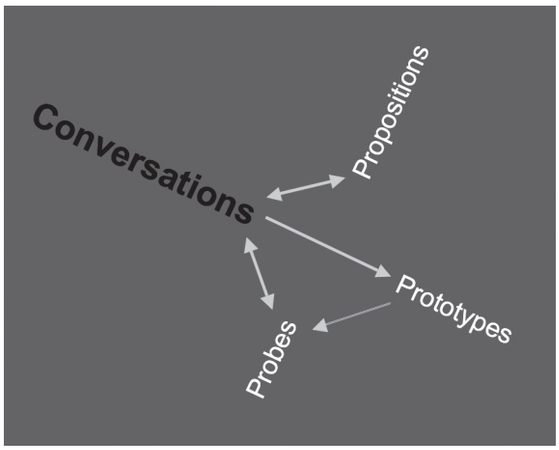
This iterative cycle of proposition and application was explored throughout each stage of the project. Heron (1989: 18) refers to research as a 'process of systematic (and not so systematic) inquiry that leads to knowledge stated as propositions'. Simon (1969) distinguishes the use of propositions in science and in design by highlighting that science raises the question of whether the proposition is 'valid or true?' while design asks 'will it work better?' (cited in Jelinek et. al 2008: 318). Heron also argues that there are two ways of interacting with people within research, one is where people 'have no direct contribution to formulating the propositions purported to be about them....the other way the cooperative inquiry is for the researcher to interact with the subject so that they do contribute directly both to hypothesis making, to formulating the final conclusions and to what goes on in-between' (Heron 1989: 19).

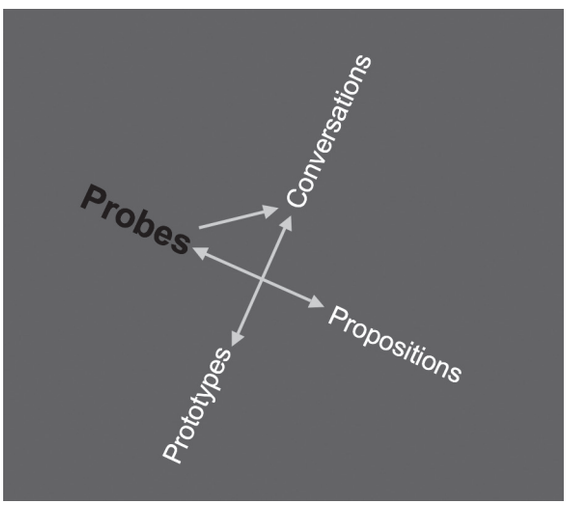
Our initial actions in the context of the project involved exploring what such a tool could offer. The outcome of this exploration provided ideas for design propositions, which then were used as conversation triggers with industry partners. The subsequent engagement with our industry partners provided contextual depth and insight into the granular application of these design propositions within the specific production team's context. We took Heron and Reason's (2006) position that cooperative inquiry involved research 'with' people rather than 'on' people:

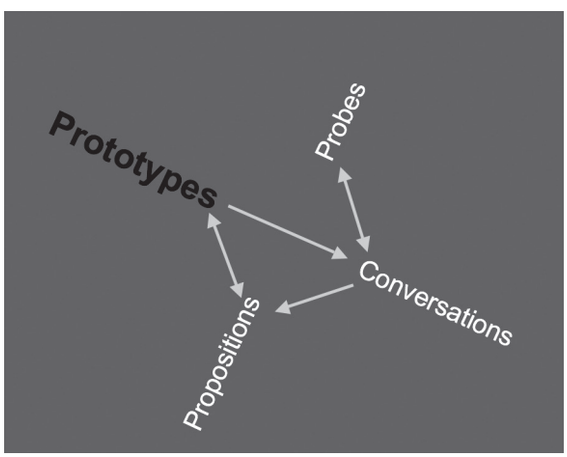
> 'In cooperative inquiry traditional research roles are replaced by a co-operative relationship so that all those involved work together as co-researchers and as co-subjects. Everyone is involved in the design and management of the inquiry; everyone gets into the experience and action that is being explored; everyone is involved in making sense and drawing conclusions; this way everyone involved can take initiative and exert influence on the process'. (144)

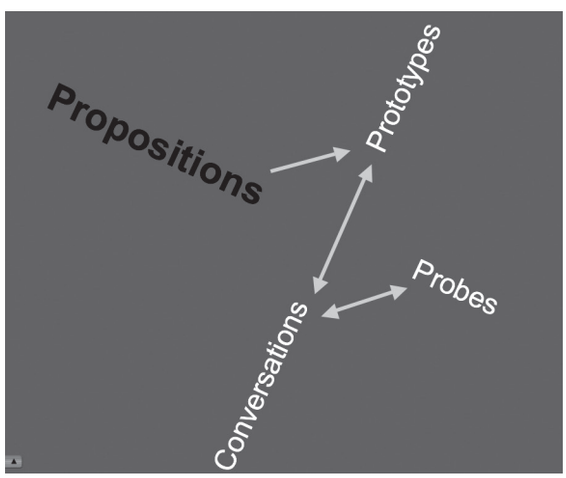
Prototyping

The propositions developed throughout our inquiry were used to inform the design of a Prototype through application. Prototyping is a common method used within product development projects to explore ideas and trial versions within a development. These prototypes can provide users with









the chance to use or critique a development, and they can be an opportunity to extend their understanding of what a thing is or might be. In the field of interaction design, project prototypes are often used as triggers to engage users. These prototypes can extend from being literal, poetic (Gaver et. al 2003) or sketches (Ehn et. al 1991) depending on the intention or objective of the user. Within this project, prototyping has been both a method for exploring ideas and realizing scenarios; this has been a process akin to Buchenau and Fulton Suri's (2000) notion of 'experience prototyping'. Prototyping has been the focus of what is being explored – the design and development of a digital online video annotation tool. Through the co-design method of the design team as user and creator, the various iterations of prototypes (as sketches, conversations and systems) have enabled the team to experience the idea in development.

The development of methods and systems to enable rapid prototyping has been a dynamic area of development in the engineering and product development fields. In this project, the team set out to explore how prototyping as an iterative process of idea generation could be applied to rich-media product developments such as television, video or advertising contexts.

Buchenau and Fulton Suri (2000: 424) highlight that 'increasingly as designers of interactive systems we find ourselves stretching the limits of prototyping tools to explore and communicate what it will be like to interact with things we design'. The authors believe that Prototyping is a key activity within the design of interactive systems and that prototyping is valuable in three critical design activities – understanding existing user experiences and context; exploring and developing design ideas; and communicating design concepts. Prototypes also influence the way we think, solutions and imagination are inspired and limited by the prototyping tools we use (Buchenau & Fulton Suri 2000). Houde and Hill (1997) caution that the term prototype can mean different things to different members of a multidisciplinary design team and with different meanings there will be different expectations, therefore designers need to be clear about who their audience is and to communicate clearly what the prototype does or doesn't represent. They believe that what is important is not what media or tool was used to create the prototype but how the prototype is used by a designer to explore or demonstrate some aspect of the future of the artifact (Houde and Hill 1997).

Buchenau and Fulton Suri (2000: 424) discuss the role that designers and researchers have had in 'pushing the boundaries of prototyping beyond the range of traditional methods (citing Burns et al 1995, 1997) and in developing understanding of the value of different forms of prototypes'. They reference the work of Houde and Hill (1997); and highlight the various ways that other authors have explored prototypes:

- >> *Different levels of fidelity* (citing Wong 1992)
- >> *Models for use in the context of participatory design* (citing Ehn and Kyng 1991 & Muller 1992)
- >> *Understanding whether the prototype needs to answer questions about 'role', 'look and feel' or 'implementation'* (citing Houde and Hill 1997)
- >> *Prototypes for different audiences* (citing Erikson 1995 and Wagner 1990)
- >> *Prototyping as a design practice promoted within the business community as a key element in innovation* (citing Leonard et. al 1997 and Schrage 1999)

Buchenau and Fulton Suri (2000) contribute to this body of work through the concept of 'experience prototyping' which they define as methods that allow designers, clients or users to 'experience it themselves' rather than witnessing a demonstration or someone else's experience. In order to work effectively as a design team it is important to develop a common vision of what the team is trying to bring into being. Therefore it is a powerful asset to have tools and techniques, which create a shared experience, providing a foundation for a common point of view (Buchenau and Fulton Suri 2000).

Alternatively Sanders (2001) believes that the role of designers is to create the scaffolds or infrastructures upon which non-designers can express their creativity. That all people have the capacity for creativity when it comes to experiences they care about and that designers need to provide them with the experiences that support first ideation then expression. She suggests a four step process: firstly, that people become immersed in the experience of working on the job and dealing with the problems (users are asked to observe and document their own behaviors during this time); secondly, they activate their feelings and memories about the experience; thirdly, helped to dream about the future; and fourthly, the bisociation and expression of new ideas relating to the future experience. The last 3 steps are conducted in workshops.

All these approaches have informed the project.

DISCUSSION

This project is particularly interested in the design and development of a tool for online digital video production. Conventionally video production teams are collocated when working on projects. Offsite activity usually is confined to briefing meetings with clients, and filming at off site locations. This however is changing. The evolution of new editing software that is able to be used on standard personal and/or professional computing systems has begun to change the way in which teams work and the tools and systems that they use in the process. This has been largely supported by the rise of the home or amateur video phenomenon and lightweight technologies to support them.

Media Industry context

Baker et. al (1999) conducted a series of case studies in 1995-96 on early adopters of remote collaboration technologies within the media production industries in Sydney, Los Angeles and London. They found that certain industry segments – animation, post-production and advertising – were more likely to be early adopters. 'Likely impacts of remote collaboration in media production are: more overlap between pre-production, production and post-production activities; faster work pace; enhanced creativity; and improved quality of work life.' (Baker et. al 1999: 303)

The functionality that communication technology supports through electronic delivery enables remote access to resources and materials, and therefore remote creative collaboration and the possibilities of workers within this field to be engaged in multiple projects at one time (Baker et. al 1999). The authors reference Mizer (1994) to illustrate this point, citing the example of Spielberg who used remote collaboration during the post-production of Jurassic park in California, while he was in Krakow shooting *Schindler's List*.

The impact of the use of computers in film production is extreme. What was once a linear process can now be undertaken concurrently rather than in linear fashion; that is pre-production, production and post-production can occur simultaneously (Baker et. al 1999). At the same time, film production has become organized more globally because of the availability of low cost facilities and crews outside the major film production areas and because of a scarcity in local skills and talents (Baker et. al 1999). Simultaneously, producers rely more and more on outsourcing of specific tasks. For example much of the post-production work is outsourced to small companies, which have specialized equipment and highly trained personnel.

Translating this to everyday practice

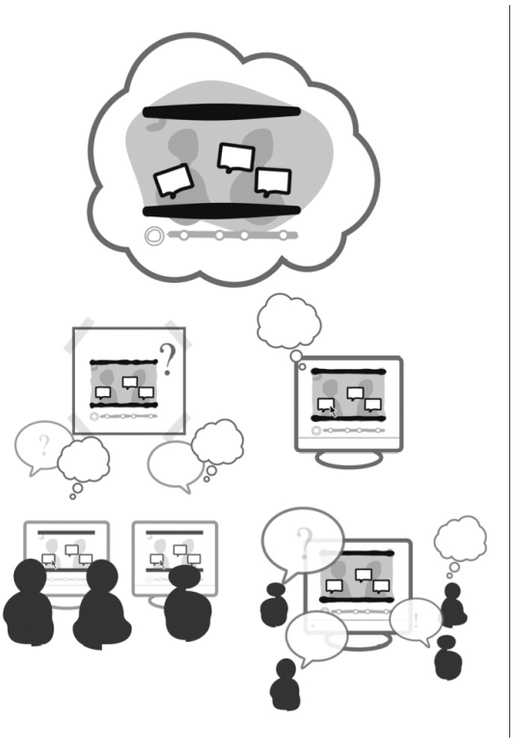
Part of this phenomenon of rapid change within digital video production has been the rise of social networking systems such as MySpace, Facebook and YouTube, which have provided new platforms for people to share their work and to gain input and insight from broader communities. In this project the objective was to explore what these technical, socio/cultural developments mean for conventional creative and production teams that work within the advertising and media industries. How might they inform or better enable people within their professional practice?

In the beginning – the initial proposition

The idea of the overall project was initially developed on the basis of observation of new social network systems and platforms that were being commercially developed and their potential to contribute to the activities of the advertising industry. This approach was based in a market driven research and development process. This was the conventional process of *looking out* and *looking in*. *Looking out* at what is taking place in the market and world, and *looking in* at what might this mean for us as researchers working with commercialization partners. However, once the project team began to form and the idea of exploring digital video production became the focus of the research, there was a significant shift in the theoretical basis and the methods of the project. This can be articulated as the shift from a market driven approach to a human-centered design approach to the project. This human centered approach held equal value to ideas and possibilities and the human enactment of them.

Exploring propositions

The first stage in the project was an exploration of the design proposition. This used an idea generation process based on a 'what if' model of inquiry. Through a series of conversations, observations and analysis of personal experience in conjunction with other developments within the field of digital video, the design team explored ideas of what it would, or could, be good 'to do' when working with digital video through distributed online systems. For example, conversations often sounded like "wouldn't it be great if you could..., or, I wonder how you could modify XXX system to make that possible for people? And, do you think other people would...?" The outcome of this process was that a series of statements and questions emerged that was based on, both, physical actions and practices, as well as technical requirements. Although a number of the design team are engaged in the production of digital video themselves, it was acknowledged that we represented a limited kind of user and we were interested in what it means for those who create and edit digital video within commercial or production contexts.



The next step in the project was to establish a working relationship with a collaborative partner who is engaged in this kind of professional work and who was also interested in exploring the proposition with the design team. The intention with the collaborator was not to find a client to design *for*, but rather to find someone to design *with*. The objective was to use a combination of participatory design methods with propositional design activities. It was essential that the project partner perceived themselves as co-investigators, who brought particular expertise to the overall project team and that they were not a client being designed for. In addition to this, the project partner were also the initial representative group of a broader field of practice. Thus a project team was formed bringing together interaction design researchers at RMIT and, a research and production team at Beyond:30 whose focus is on interactive advertising. This project is funded within the Australasian CRC for Interaction Design.

The first stage in the process was to present the proposition to the project partner, and then through a series of conversations to explore and extend this to include their perspective, their *'what ifs'* and their expertise. Through this process some elements of the initial proposition were discarded and others were added. Within the language and practices of design, it was an extended process of proposition and critique, and it was essential that we did not limit our conversations to *what is now*, and stayed open to *what would be good if*. As Heron and Reason (2006) describe this:

> 'Co-researchers assemble to share — in both presentational and propositional forms — their practical and experiential data and to consider their original ideas in the light of it. As a result they may develop or reframe these ideas, or reject them and pose new questions'. (146)

To explore the initial proposition the project team undertook a series of exploratory discussions, using the current practices and processes of the production as the trigger for re-thinking what might be. Conversations focused on *what do you do now? What is essential to your process and what would it be great if you could do in the future?* The production team work with industry research partners who are based internationally, and the lead researcher is on a plane as often as he is at home. This opens up particular challenges around time (time zones and where people are when, especially with deadlines, and speed, the need to work to tight deadlines), clarity (project management around issues of what is expected, who is doing what, and sign off on developments) and communication. The communication aspect was particularly interesting. Although the project team had a website to communicate with partners, and they also used email, many of the research partners preferred to use the telephone. It was unclear as to whether this preference for voice was based on ease (e.g. they are tired of typing and emails and voice is quicker) or a preference for personal contact. This created a particular challenge for the team, as it was a kind of 'Chinese whisper' approach to knowledge sharing; she says to him, he tells her, then she tells the team.

In response to this information the design team then started to work on a conceptual design, exploring ways of articulating the current process and core concerns into an idea of a collaboration and communication environment. This environment focused on transparency, asynchronous communication, voice and ease. This concept was developed up through a series of phone meetings and the exchange of files for review.

The exploration of the application was based on two interconnected aspects of an interaction design project, the technology and the use or actions. As argued by Johnson et. al (1995) both aspects are essential to the successful design of technological tools and systems, both have the capacity to lead, guide or limit the design process and outcome. A well working technological system that has no relationship to the activities of application is a failure. A system designed in conjunction with the activities of users that constantly breaks or is unstable is equally problematic. This is the true challenge of the proposition and application approach to interaction design, finding the balance between extending the users experience and creating tools and systems that they could never have dreamed of; whilst at the same time building tools and systems that are accessible to the user within their specific context and application.

Roles and scenarios of use were the devices used by the project team to explore the proposition and to find the balance between ideas and their meaning in application. Many have argued for the effectiveness of scenarios to enable better design solutions to people's needs (for example Grudin and Pruitt 2006; Caroll 1995; Hanington 2003). Typically scenarios are used as speculative devices (Hanington 2003), where a narrative of action or use is created in order to find out more. Scenarios are used to explore *what is*, in order to think through *what might be* (Caroll 1995). Often this is done in response to secondary data, such as accounts from the literature, interviews or observation. In this project, scenarios were developed *in conjunction with* the project partner as a method for them to describe what they currently do in relation to specific activity requirements and particular people. This was a spontaneous process of scenario development (Vaughan et. al 2008) that made what was implicit to the production team explicit to a third party and the rest of the design team. There was a particular interest in going beyond Hanington's (2003) notion of user and task, to exploring the importance of roles and actions. This approach also ensured that we did not fall into Grudin and Pruitt's (2006) concern about the lack of critical exploration of the origins of the scenario. The extensive group discussion ensured that the process was not limited to one person's perspective or agenda.

Understanding through observation, conversation and scenarios, the roles and actions of those involved in a digital video production team were essential to the project's development. As was the need to gain specifications knowledge about the production team's current 'toolbox'. The combination of these two areas of information aided the project team to explore design solutions and the development of working system prototypes for trial and experimentation.

An interesting aspect of the project has been the unintentional modeling of the project's proposed innovations in enabling distributed working environments, with our own working methods and methodology. The two parts to the project team were located on the two sides of Australia. Throughout the project we met twice for face-to-face workshops and discussions. The rest of our communications have taken place by telephone, Skype, email, discussion boards and a blog.

Refining an Idea

After six weeks of initial exploration the conceptual design was presented to the research centers research leaders and local industry project partner. On review of the project's progress to date it was decided that the concept needed to be presented to a broader advertising and media industry audience. Although the project collaborators were representative of particular practices within digital video production, there was concern that what we were developing may not be of relevance to a broader industry.

One month later in February 2007, the project was presented to twenty representatives of industry in New York. This presentation took the form of a Flash video animation of the idea of the system and a propositional scenario for use within industry projects. Communication, transparency and annotation using voice, image and text were the key components. On completion of the presentation the industry representatives could see the potential of the system, they particularly liked the idea of voice annotation, they found the interface design accessible and engaging, and their responses to the potential for greater transparency were divided into two key camps. Those who liked transparency as they thought it would lead to clearer work practices and project memory, and those that felt that it would limit people's innovation and willingness to go out on a limb.

This feedback from industry was particularly useful to the entire project team. The Flash conceptual design was used as a trigger to re-think and reflect on what we had discovered so far, and we were able to use the comments by industry as another form of catalyst to think through our own actions, preferences and the implications of working through such a system.

The methods that we were using at this stage of the project were *critique, reflection, proposition, triggers, scenarios and conversation*. These methods were not only enabling the project but also being realized in the evolving design development.

The next phase of the project focused on the design and development of a working prototype for use within the production team's context. It was decided that through the design of one particular prototype for specific use, we could explore broader concepts and contexts for application. The production team was also interested to explore how such a tool could be applied to and thereby improve their work practices.

Through a face-to-face design workshop the project team critiqued project developments to date, and explored future design developments. To do this, it was essential that the discussions focus on current roles, activities and technology being used within the production group. The initial Flash animation was the trigger for the conversations, as was a walk through tour of their current studios and research premises. A key objective of the project was not to add to the team's current activities. The tool had to contribute and provide greater 'benefit' through use than their current practices do. There had to be a fit between *what is* and *what could be*. This benefit could be framed in relation to any of the current challenges around time, connections, clarity and communication. Fichman (1992) in his discussion of diffusion theory highlighted that technology would only be of use to any single adopter if a significant number of members of a network (team) were using the technology. Importantly he highlighted that if the use of the technology is intertwined with organizational routines an individual's interaction within the system must fit within some larger organizational process, and hence any individual's use of the system affects and is affected by the pattern of use in the wider community of other users.

Who does what, and the chain of actions within projects was a dominant theme in the discussion. It was important that the design team was able to understand this from a role and flow perspective. An additional challenge to the project was the fact that although we were focused on the design of an online system that could be used by distributed teams, the production team was co-located in one building. The project team considered this paradox and the outcome was that although that is where the core team is, they do also work with international colleagues and could see the potential relevance of the tool to their current and future work.

To articulate the outcomes of the discussion, scenarios of use evolved through the conversation and the critique. This provided a kind of storyboard of actors and locations to emerge. It was discovered that the project team have set workflow within projects and this could be divided into particular actions that happen in 'clumps' until they are resolved and they can move on to the next phase. These clumps of activities were understood to be types of activities, which helped to categorize functions and actions. This provided the design team with two sets of data. It provided a framework for understanding types of activity whilst providing intimate knowledge about the various activities that particular team members would be doing during the trial of the working prototype. The scenarios also enabled the production team to articulate what they do – what was implicit shared knowledge for them could be easily shared with the rest of the project team.

Technology and current tools and systems were an important part of the discussion and the scenario development. Making the shift to an online environment rather than working with specific machines on a local server opened up all sorts of new challenges. These included issues of security, firewalls, file compression and rendering time. At times these challenges seemed too big to overcome and put the idea of the tool under question. It seemed that the technology might thwart our desire not to add to people's current work practices. A tool or system that hampers or adds complexity to current practices is not an innovation and is not human-centered in its objectives. Fichman (1992) referred to this as a 'knowledge burden' and is a significant barrier to adoption. Our principles were that it was acceptable to extend or change practices, but we couldn't add to them. Fortunately through collaboration and experimentation across the team and drawing on the diverse knowledge of all the participants, methods were discovered to enable online file upload and sharing to occur without creating a greater workload or compromising current confidentiality and security requirements.

Designing through action

Following this process the design team then set about designing and developing a working prototype for use by the production team. The scenarios of use and technical requirements were the basis for this activity. In order to be able to view the project as a more generic issue of role, action and function, the team then abstracted what was learnt from the scenario into a series of propositions about actions and functions. A project plan was developed where these actions were then translated into specific design and development activity.

In October 2007 the working trial prototype was released to the production partners. They were working to a project deadline and used the tool as part of their everyday work activity. In order to simulate real use the design team assumed the roles of help desk, assisting with faults and challenges in the system through their use. This was the first time that the production team had seen this version of the prototype. Working this way enabled them to engage in its use in the same way that they would with any new product. The design research team also had access to the system and could observe activity. In this way the project team assumed three particular roles in the project development:

>> End users
>> System support
>> Research observation

Throughout this phase of the project, the design team continued to explore new propositions and applications for the tool, based on the information being gained through the trial process. Of particular interest in this phase was the shift from understanding the roles and actions through functions, and exploring

them through meaning. By this we mean, designing an environment that supports meaningful engagement. To do this, the project team adopted the use of 'user stories' (Cohn 2004).

'A user story describes functionality that will be valuable to either a user or purchaser of a system or software. User Stories are composed of three aspects:
◊ A written description of the story used for planning and as a reminder
◊ Conversations about the story that serve to flesh out the details of the story
◊ Tests that convey and document details and that can be used to determine when a story is complete'

During the ensuing phases of the project, the design and development team embraced agile methods to communicate functional and experiential requirements. Cohn (2004: 18) talks about stories being 'negotiable' and as 'reminders to have a conversation', and Davies (2001) points out that cards 'represent customer requirements rather than document them'. We found this a helpful method for moving from specification of function towards discussion around user experience. Each user story worked like a mini scenario, helping draw out the implied actions and relationships between users and the prototype.

An example of some of the stories were:

> People can belong to a project
> People can make a study within a project
> People can upload a video
> People in a project are notified when a video is uploaded
> People can make a text annotation on video
> People can read text annotation on a video
> People can use the timeline to access annotations
> People can jump to an annotation in a video
> People can navigate the annotations in a list
> People can see how many annotations are on a video
> People can reply to an annotation

One interesting aspect of adopting this agile methodology is the extent to which you can simplify and break down complex interactions into brief descriptions of experience. We found it very helpful for making sense of the complex relationships between content, groups and workflow that was emerging in the project. This is an example of how the project team continued to adopt the methodologies being designed within the system, into their own working practice. Design reviews focused on scenarios of application and critique of actions to date.

WHAT WAS DISCOVERED

Following the completion of the production team's deadline, the project team then undertook another face-to-face critique of activities to date.

The prototype used in the first trial was the first probe used within the discussion. This included both a review of what happened and reflections on the experience by the production team. This face-to-face exchange was essential. Until this time we had two versions of what was happening: the observations of the design team and the experience of the production team. The design team was able to draw conclusions based on observed activity, posts on the discussion board and exchanges through email. Their knowledge was particularly technical and process driven. The production team had knowledge gained through use. They were able to recount what they did, what worked and how they engaged with the tool. The design workshop enabled these two lots of data to be integrated.

The production team reported that using the system had not added to their workload. The functions within the tool were appropriate to their use, although they did find aspects of the environment confusing. It seemed that spaces for activity and the exactness of functions were the main problem. In designing the tool the team had endeavored to deliver on all the complex actions outlined in the initial scenarios, including the 'wouldn't it be nice if you could' features. What became apparent is that those additional features were just that, additional to the day-to-day activities and not something that this team needed in their work processes. The asynchronous technologies for comment and review were seen to be advantageous. Team members felt that it enabled them to be freed up to work on something else. They were able to check on co-workers activity without having to repeatedly ask if they had done some activity yet. Technological issues about the exactness of representations within the graphic interface were another point of concern for the production team.

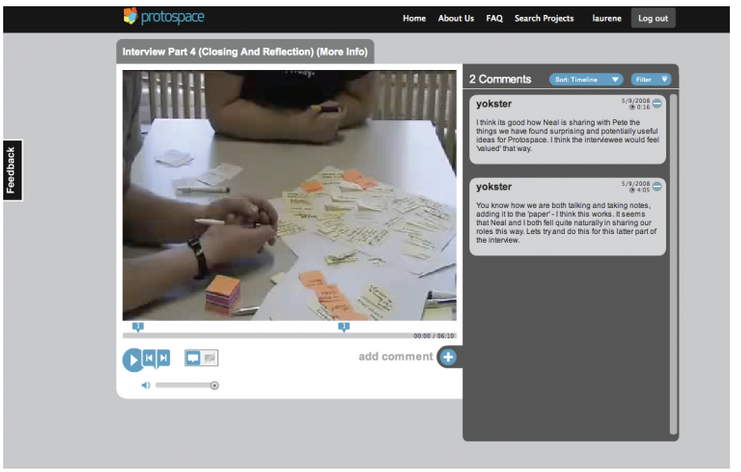
The initial concern about the use of an online system for a co-located production team was another point of feedback and discovery. This was a point that the design team had no idea about; they were limited to what was reported or observable. The production team however had deep knowledge of what occurred and what it meant for them. Although the team made a concerted effort to use the system, and found many aspects of it to be useful, they did at the same time supplement their activity through face-to-face conversations, corridor conversations and over the shoulder discussions. It was concluded that this was probably inevitable when a tool such as this is used in a context such as this. And rather than seeing this as a flaw, it should be seen as an additional or complimentary activity. Although not perfect in design the annotation/prototype tool had been of use within that body of work. It had helped to support work, and create some new and advantageous ways of working and communicating for the team.

Throughout the trial process, the design team continued to explore this proposition based on observation and experimentation and user stories. This resulted in some new design concepts and a more stable system.

The second part of the design workshop focused on these concepts, which were then used as another probe to move beyond the recounting of experience to thinking about future possibilities. There were many connections between what was observed and what was experienced. This resulted in the new concepts having resonance with the production team. Then through a process of review and critique, the entire team further developed these new concepts and a new series of questions about how we could design a tool that was aligned with people's roles and meaningful actions could be articulated into design functions.

Going forward

The data from this last workshop was fed back to the developers for stage 2 of the project. This stage was about building a high fidelity prototype and further exploring a broader context for the application of the tool, namely the creative advertising market. This stage also included two concurrent design method activities, the first was conducting secondary research into the media and advertising market, the current trends and shift in practices as well as predicted future trends by industry analysts. Secondly two members of the team with backgrounds in advertising and marketing decided to role play the relationship of advertising agency and client by exploring the roles, tools and types of conversations that occurred during a typical creative advertising process that spanned the continuum from receiving a project brief from the client, to ideation and development of concept, to video production. They challenged each others understanding of why and how information is communicated and shared. They explored 'what if' questions such as "what if the creative team is confused by the creative brief,



why can't they view the clients original brief?" or "can the client be sent an RSS feed on their mobile to notify them of changes to creative material that they need to sign off on without going into the agency's office"? This role-play was mapped out into a standard process map and overlaid with the conversations about opportunities, possibilities and implications for the design of a rich media annotation and prototyping tool. It also acknowledged that the type of agency (global, local, interactive etc) or project scope would alter the steps undertaken in this analysis and hence the need for flexibility in the design of the tool to accommodate different practices and not necessarily sequential processes. The analysis from the literature review and the role-play revealed that an online annotation and prototyping tool among other things would need to:

>> Provide a repository for static images with which the creative team can cut and paste ideas.
>> Be able to hold project specific visual history.
>> Provide a repository for briefing documents.
>> Provide a storyboard template for the chosen images and ideas.
>> In the TV Pre-production stage there is material that is stored and reviewed when making decisions, items such as video tapes of proposed locations and actors, loca tion maps, visual samples, music samples as well as call sheets drafts (material, phone numbers, timings etc) and storyboards. This is all the material that teams need to make decisions on before shooting the video.
>> The creative process would benefit from the ability to be annotated and commented on by all the people involved, including end users or audience.

These observations and critiques of basic process and moments of opportunity for a collaboration tool, informed the outline of new propositions and 'what if', that were then tested with advertising industry participants whilst also being used as a framework around which ongoing developments could be critiqued. Stage 2 is almost complete and the design team is working towards a stage 3 beta testing of the system in early 2009.

CONCLUSION

This research has explored, through a collaborative project, the design and development of a working prototype for collaborative online digital video production. The design-based methodology to achieve this has involved a cyclic process of propositions and applications through conversations and scenario making. These scenarios have been developed through the process of discovery and experimentation by the project team. They have been devices for making the implicit, explicit, and looking at what is, in order to explore what may be. This process has been essential for the project to make the transition from the big picture of industry trends and developments, to looking at the distinctly local practices of one particular team. The next phase will be for the project team to take the current working prototype and explore its relevance to other specific users, knowing that this will involve another cycle of activity. The current prototype will become the next trigger around and from which new things can emerge. Although this project has focused on a specific area of design development, the discoveries from the project regarding methods and methodologies for managing teams and engaging project partners we would argue are applicable to many such inter-disciplinary and applied explorations. //

REFERENCES

Baker, E., Geirland, J., Fisher, T. and Chandler, A. (1999) 'Media production: towards creative collaboration using communication networks', *Computer Supported Cooperative Work* (8): 303-332

Barsh, J. (2008) 'Innovation management: A conversation with Gary Hamel & Lowell Bryan', *Mckinsey Quarterly*, 2008 (1).

Bryan, L. and Joyce, C. (2007) *Mobilizing Minds*, New York: McGraw Hill.

Buchenau, M. and Fulton Suri, J. (2000) 'Experience prototyping', in *Proceedings of the 3rd conference on Designing Interactive Systems: process, practices, methods and techniques*, ACM and accessed from IDEO website, San Francisco, CA (viewed 2 March 2008) <http:/www.ideo.com/pdf/fultonsuri&Buchenau

Burns, C., Dishman, E., Johnson, B., and Verplank, B. '"Informance": Min(d)ing future contexts for scenario-based interaction design'. Presented at *BayCHI* (Paolo Alto, August 1995), Abstract available at http://www.baychi.org/meetings/archive/0895.html

Burns, C., Dishman, E., Verplank, B. and Lassiter, B. (1997) 'Actors, hari-dos and videotape: Informance design. Presented at *Presence Forum* (Royal College of Art, London, November 1997). Paper available at http://www.presenceweb.org/papers

Caroll, J. ed. (1995) *Scenario-based design*, New York: Wiley.

Champy, J. (1995) 'Re-engineering a light that failed', *Across the Board*, vol 32 no 3, March 1995: 27-31.

Cheney, G. and Christensen, L.T. (2004) *Organizational Communication in an age of globalization: issues, reflections, practices*, Illinois: Waveland Press.

Cohn, M. (2004) *User Stories Applied: for Agile Software Development*, Addison-Wesley.

Davies, R. (2001) *The Power of Stories*, XP, Sardinia.

Denyer, D., Tranfield, D. and Ernst van Aken, J. (2008) 'Developing Design Propositions through Research Synthesis', *Organization Studies*, 29 (3).

Dourish, P. (2006) 'Implications for design', In *Proceedings of the ACM Conference on Human Factors in Computing Systems*: 541-550.

Edmondson, A.C. (2001) 'Disrupted routines: Team learning and new technology implementation in hospitals', *Administrative Science Quarterly*, Vol. 46, No. 4, December: 685-716.

Edmondson, A.C. (2003) 'Learning How and Learning What: Effects of Tacit and Codified knowledge on Performance improvement following technology adoption', *Decision Sciences*, 34 No. 2 (Spring issue).

Ehn, P. and Kyng, M. (1991) 'Cardboard computers: Mocking-it-up Hands-on the future', In Greenbaum, J. and Kyng, M eds., *Design at Work*, New Jersey: Lawrence Erlbaum.

Erikson, T. (1995) 'Notes on design practice: Stories and prototypes as catalysts for communication' in Carroll, J. ed. (1995) *Envisioning Technology: The scenario as a framework for the system development of lifecycle*, Reading: Addison Wesley.

Fichman, R.G. (1992) *Information technology diffusion: A review of empirical research*, MIT Sloan school of management, viewed 8 October 2008 <http:/www2.bc.edu/~fichman/fichman_1992_icis_it_diff_review.pdf

Gaver, W., Beaver, J. and Benford, S. (2003) 'Ambiguity as a Resource for Design', *CHI 2003*, April 5-10, Ft. Lauderdale, Florida, USA.

Grudin, J. and Pruitt, J. (2006) *Personas, Participatory Design and Product Development: An Infrastructure for Engagement*, Microsoft. http://www.research.microsoft.com/research/coet/Grudin/Personas/Grudin-Pruitt.doc

Hagel, J. (1999) 'Net Gain: Expanding markets through virtual communities', *Journal of interactive marketing*, 13 (1).

Hagel, J. and Seely Brown, J. (2002) *Orchestrating Business Processes: Harnessing the value of Web Services Technology*, viewed 23 May 2008: <http:/www.johnseelybrown.com/paper_orchestratingwebservices.pdf
Hanington, B. (2003) 'Methods in the Making: A Perspective on the State of Human Research in Design', *Design Issues*, 19 (4): 9-18.
Heron, J. (1981a) 'Philosophical basis for a new paradigm', in Reason, P. and Rowan, J. eds. *Human Inquiry: A Sourcebook of New Paradigm Research*, Chichester: Wiley.
Heron, J. and Reason, P. (2006) 'The practice of co-operative Inquiry: Research "with" rather than "on" people', Chapter 12 in Reason, P. and Bradbury, H. (eds.) *Handbook of Action Research* (2006 edition), London: Sage.
Houde, S. and Hill, C (1997) 'What do Prototypes Prototype?', in *Handbook of Human-computer Interaction* (2nd ed.), Helander, M., Landauer, T. and Prabhu, P. eds., Amsterdam: Elsevier Science.
Jelinek, M., Georges, A., Romme, L. and Boland, R.J. (2008) 'Introduction to the Special Issue Organization Studies as a science for Design: Creating Collaborative Artifacts & Research', *Organization Studies*, 29 (03).
Johnson, P., Johnson, H. and Wilson, S. (1995) 'Rapid Prototyping of User Interfaces Driven by Task Models', in *Scenario Based Design*, Caroll, J. M. ed., John Wiley.
Leonard, D and Rayport, J.F. (1997) 'Spark innovation through empathetic design', *Harvard Business Review*, November/December: 102-113
McKinsey Global Survey Results (2008) 'Creating Organizational transformation', *McKinsey Quarterly* (July 2008).
Mizer, R.A. (1994) 'From Post-Production to the Cinema of the Future', *SMPTE Journal*, December: 801-804.
Muller, M.J. (1992) 'Retrospective on a year of participatory design using the PICTIVE technique', in *Proceedings of CHI'92* (May 1992) ACM Press, 455-462.
Sanders, E. (2001) 'Collective Creativity', *LOOP AIGA journal of interaction design education*, August 2001:3. Viewed 01 February 2008 <http:/www.maketools.com/pdfs
Shrage, M. (1999) *Serious Play: How the world's best companies simulate to Innovate*, Harvard Business School Press, Boston.
Simon H.A (1969) *The Science of the Artificial*, Cambridge, MA: MIT Press.
Vaughan, L., Rittenbruch, M., Viller, S., Yuille, J. and MacColl, I. (2008) 'Spontaneous Scenarios: an approach to user engagement', *Proceedings of CHI08*, April 5 - April 10, 2008, Florence, Italy.
Wagner, A. (1990) 'Prototyping: A day in the life of an interface designer', in Laurel, B. ed. (1990) *The Art of Human Computer Interface Design*, Reading: Addison-Wesley: 79-84.
Wolf, T.V., Rode, J. A., Sussman, J. and Kellogg, W. A. (2006) 'Dispelling design as the "Black Art" of CHI', In *Proceedings of CHI 2006*: 521-530. Montréal, Canada: ACM Press.
Wong, Y.Y. (1992) 'Rough and Ready Prototypes: Lessons from Graphic Design, Human Factors in Computing Systems', *Proc. CHI'92, Posters and Short-Talks*, New York: ACM: 83-84.

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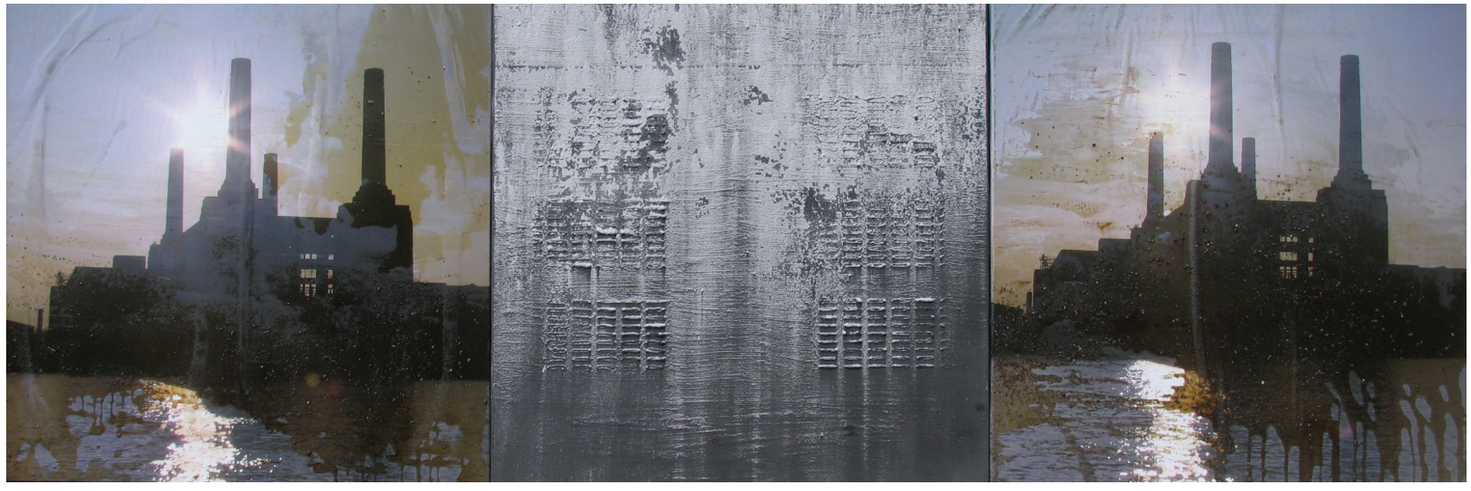

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